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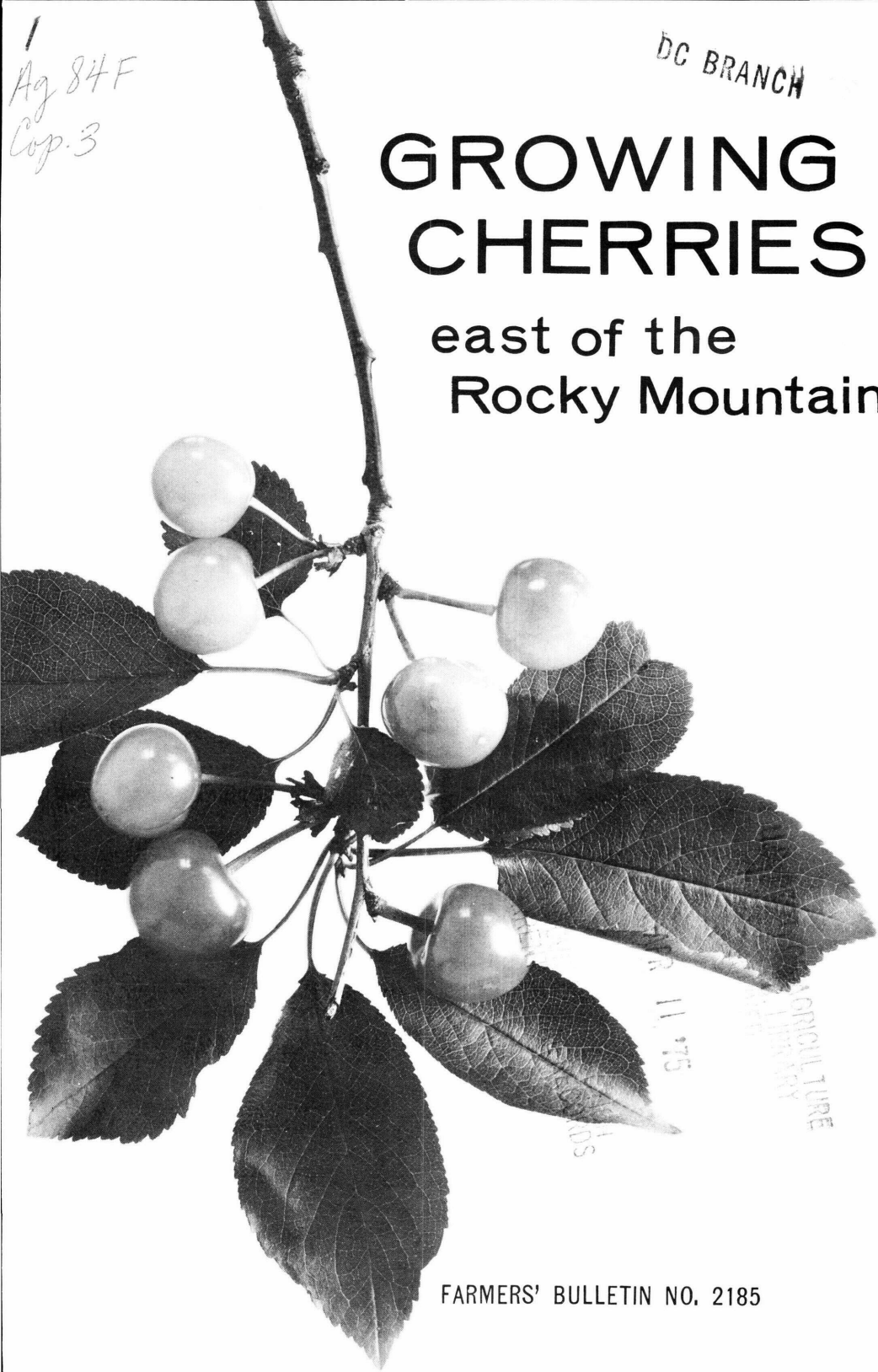
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GROWING CHERRIES

east of the
Rocky Mountains

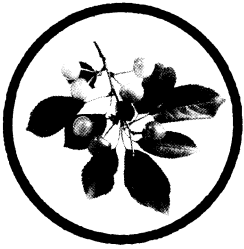


FARMERS' BULLETIN NO. 2185

U.S. DEPARTMENT OF AGRICULTURE

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GROWING CHERRIES

east of the Rocky Mountains

Prepared by the Northeastern Region
Agricultural Research Service¹

DISTRIBUTION OF TREES

Approximately 11 million cherry trees of bearing age grow throughout the United States. They are distributed in every State, but almost three-fourths of them grow in Michigan, New York, Wisconsin, and Pennsylvania (fig. 1).

Sour cherries predominate: In all States there are about 7 million sour-cherry trees, and 4 million sweet-cherry trees.

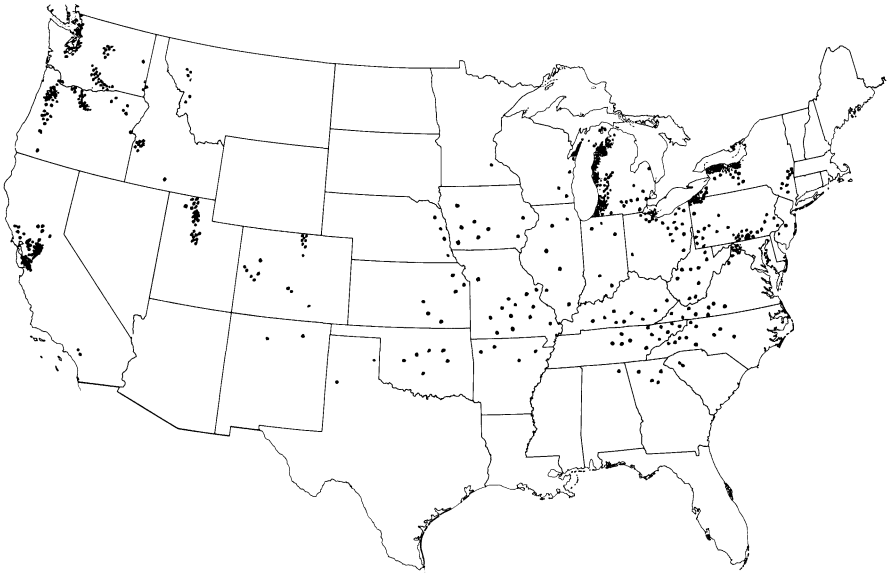
Climate, usually temperature, is the most important influence in the geographic distribution of cherry trees. Generally the trees do not thrive where summers are long and hot, or where winter temperatures are high for short periods. Chiefly because of this, they are grown only to a slight

extent in the South; there they thrive best at higher altitudes.

Winter injury to trunks of cherry trees is serious in some central and southern parts of the country (fig. 2). Sour-cherry trees are usually less hardy than apple varieties such as McIntosh and Northern Spy, commonly grown in the northern commercial apple-producing areas. Sometimes the trunks and crotches of the cherry trees are injured by low winter temperatures in the northern cherry-growing areas (fig. 3). Also, sour-cherry blossoms are very susceptible to injury by low temperatures in the spring; often they are injured more than the blossoms of peaches in the same areas.

The most important commercial sour-cherry orchards are located in the Hudson River Valley, in western New York, in western Michigan, in northern Ohio, in the Arkansas River Val-

¹ Suggestions made by M. B. Hoffman, Pomology Department, Cornell University, when this bulletin was in preparation, are gratefully acknowledged. Cornell University furnished the photographs for figures 3, 4, 5, 9, 10, 14 and 20.



BN-13491-X

Figure 1.—Map of United States, showing distribution of cherry trees in 1960. Most of those growing along the Pacific coast are sweet cherries. Note the wide distribution of trees and the concentration of plantings near the Great Lakes.

ley in Colorado, in Door County, Wis., and in southern Pennsylvania. Large quantities of cherries are produced in other States and sections, but usually the individual orchards are small and do not represent important community interests. Sour cherries often produce well in the central and southern Great Plains region, where more tender fruits usually fail.

The leading varieties of sweet cherries are less hardy than the best-known sour varieties. Their endurance of cold is similar to that of the peach. Sweet varieties are susceptible not only to wood and bud injury during winter but

also to frost damage to blossoms in early spring.

The most important sweet-cherry producing sections are in the Pacific Coast States, where the sour cherry is not grown extensively. East of the Rocky Mountains, commercial production of sweet cherries is confined largely to the Hudson River Valley, to western New York, and to western Michigan. In the last two areas, the climate is considerably moderated by the Great Lakes. Sweet-cherry trees are widely distributed in a large part of the country, but their number is relatively small except in the sections mentioned.

SELECTING ORCHARD SITES

The orchard site is the area of land actually occupied by the trees. Selecting a site for a cherry orchard requires the same general considerations that apply in selecting a site for an apple or peach orchard. The most impor-

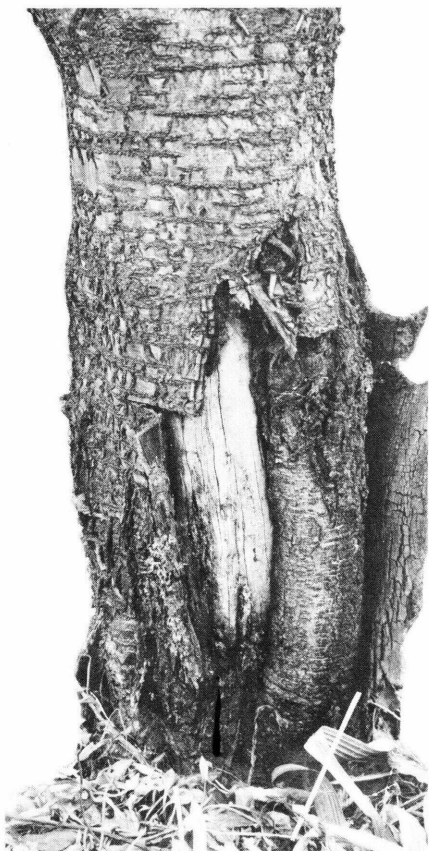
tant considerations are soil and local climatic conditions.

Soil

Cherry trees thrive on a wide range of soil types, provided the soils are well drained. Perhaps no fruit tree is more sensitive to the ill effects of a poorly drained soil than the cherry (figs. 4 and 5). In many important cherry-growing sections the prevailing soils are rather light—sandy loams and other light, sandy soils—and usually are underlain by a somewhat clay-type subsoil. Such soils occur in districts bordering the Great Lakes, where the most important commercial cherry areas east of the Rocky Mountains are located. However, the industry doubtless has developed in these districts because of climatic conditions that are induced by large bodies of water, rather than because of the existence there of any particular soil type.

Many of the better orchards in western New York are on Dunkirk clay loam, which is fairly heavy but well drained. Because the heavier, clay types often are extremely retentive of moisture or are insufficiently drained for good results, the comparatively light soils are preferred for cherries.

For success with sweet cherries, the lighter, warmer types of soil usually are regarded as essential. Soils that are droughty, and that dry out excessively, are



G-125
Figure 2.—Trunk of Montmorency cherry, showing winter injury. This type of injury is often caused by rapid changes in temperature. The injury to this tree occurred several years before the photograph was made, and considerable healing had taken place, as indicated by new bark along the right side of the wound.

unsatisfactory for either type of cherry. Moderately productive soils give better results than those having either extreme in fertility.

Temperature

Local temperature conditions should be given consideration. Cherries blossom comparatively early; usually the sweet varieties



BN-13693

Figure 3.—Sweet-cherry tree, showing winter injury to crotch and trunk. This tree grew in New York, and the injury occurred after the late growing season that preceded a freeze in early December.



DN-1971

Figure 4.—Young sweet-cherry trees (foreground and center) that grew poorly because they were planted on poorly drained soil. Trees on higher ground and better drained soil (right and left) made good growth.

blossom earlier than the sour. Sites that are subject to spring frosts during the blossoming period should be avoided. Because cold air settles to lower levels, orchards occupying sites somewhat

higher than the surrounding areas are usually less liable to frost injury than are those having comparatively low elevation. Also, the soil on higher levels is likely to be better drained.

PROPAGATION AND CHOICE OF STOCKS

The details of propagating cherry trees are of little direct importance to the average grower, who usually finds it to his advantage to buy trees from a reputable nurseryman. Trees are propagated by budding on seedling stocks in the nursery row; 1- or 2-year-old trees are commonly sold for planting. Since virus diseases that reduce fruit production can be carried in the buds, it is essential that nurserymen use budwood only from trees that are free of such diseases.

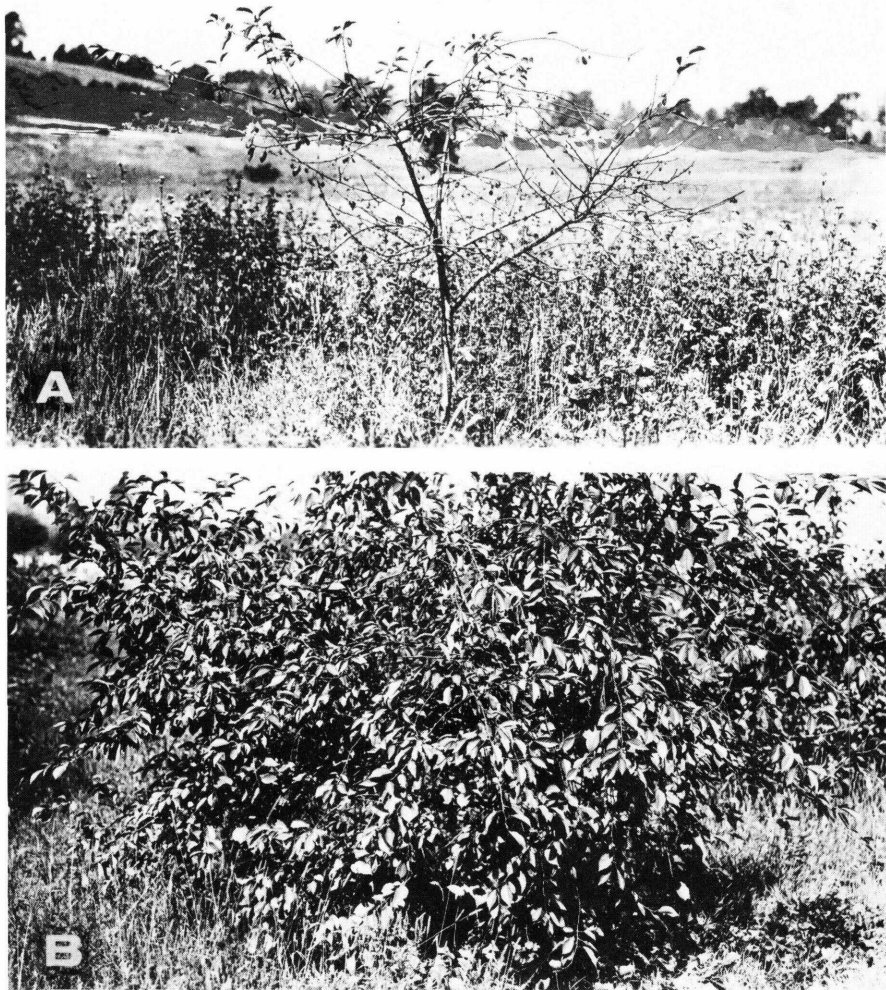
Two kinds of rootstock are in

general use—the mahaleb and the mazzard.

The mahaleb is used much more extensively than the mazzard. Usually it is satisfactory for the sour varieties, and is more productive when these varieties are grown in good soil. The mahaleb stock is also commonly used for sweet cherries, and tends to produce a smaller, more spreading tree; but there is evidence that sweet cherries often are more vigorous and longer lived when grown on mazzard stock.

Trees on mahaleb rootstock seem more spreading than those on mazzard in the early bearing years, probably because those on mahaleb usually grow more slowly and bear fruit when they are younger. Mazzard rootstock is more desirable for poor soils.

Some growers prefer the mazzard as a stock for sour as well as sweet cherries. Other growers, however, maintain that trees propagated on mahaleb stock are preferable because they come into bearing earlier and produce heavier crops while young.



BN-13486-X, BN-13486-X
Figure 5.—English Morello trees 6 years old, showing effect of soil drainage: A, On poorly drained soil; B, on well-drained soil. These trees were within 2 rods of each other, and the camera was at the same distance from each.

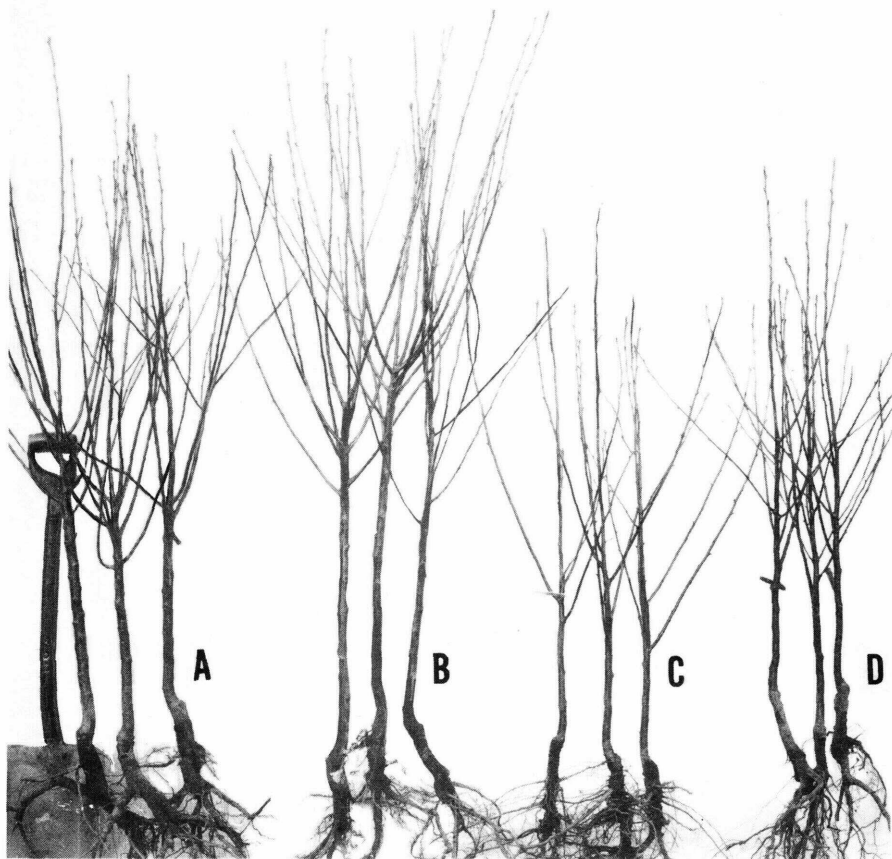
SELECTING AND HANDLING NURSERY-GROWN TREES

For sour cherries, 1- or 2-year old nursery trees may be used. Medium-sized trees, 4 to 5 feet high and $9/16$ to $11/16$ of an inch in diameter, seem preferable, but smaller trees are often satisfactory (fig. 6).

For sweet varieties, many growers are selecting 1-year-old

trees. These trees should be medium sized—4 to 5 feet high, and $9/16$ to $11/16$ of an inch in diameter.

The trees should be unpacked immediately after delivery, and every precaution should be taken to prevent the roots from becoming dry. The trees should be



P-18296

Figure 6.—Sour-cherry trees representing different grades of nursery stocks, as follows: A, 2-year-old Montmorency on mazzard stock, $3/4$ inch up in diameter, 5 to 7 feet high; B, same as A except on mahaleb stock; C, 1-year-old Montmorency on mazzard stock, $5/8$ to $11/16$ inch in diameter, 3 to 4 feet high; D, 1-year-old Montmorency on mahaleb stock, $5/8$ to $11/16$ inch in diameter, 3 to 4 feet high.

heeled in (fig. 7), unless their number is so limited that immediate planting is possible and the time for doing it is at hand.

A thoroughly drained place where the soil is mellow and deep should be used for heeling in the trees. A trench is made sufficiently wide and deep to receive the roots, and the trees are laid in at an angle. Moist soil is then worked among the roots to fill all the spaces between them. If a large number of trees are to be heeled in, they usually are placed in closely adjacent rows. When this is done, the roots in one row

may be covered with the soil that is removed in opening the adjacent trench. Trees that are tied in bundles when received must be separated before they are heeled in. If this is not done, it is difficult to work the soil among the roots sufficiently to prevent them from drying.

It is best that cherry trees be planted as soon as possible after they are dug in the nursery. Much loss of young orchard trees could be prevented if this were done. If possible, the trees should be obtained and planted in the fall.



Figure 7.—Cherry trees heeled in.

P-18299

PLANTING THE TREES

In areas where winters are extremely severe, spring planting is advisable. In the middle latitudes and where winters are comparatively mild, fall planting usually is preferable. There is an increasing tendency to plant in fall in States as far north as New York, Ohio, and Michigan.

It is very important to keep the trees in a completely dormant condition until they are set out. The reason for this is that the buds of cherry trees swell and start growth very early; if this begins to any considerable extent before the trees are planted, a high percentage of failures is likely to result.

Soil for cherry planting should be prepared according to the method found necessary for other trees and crops of a similar nature. This will vary with the location and soil type.

Cherry trees are planted various distances apart, the distance depending on the topography of the land, fertility of the soil, varietal characteristics of the trees, and preferences of individual growers. Trees of some varieties, such as English Morello, are sometimes planted 16 to 18 feet apart each way. For most sour varieties, 20 feet apart is generally accepted as satisfactory. On soils where trees grow well, a greater distance between them is desirable; this is particularly true for strong-growing varieties like Montmorency.

The bad effect of too close planting is suggested in figure 8, which shows a Montmorency orchard about 21 years old in which the trees are 14 feet apart each way. The branches interlock, so that spraying is difficult; they are long, slender and upright, making it difficult to harvest the crop.

On well-drained, fertile soil, Montmorency trees may become too close even when spaced more than 20 feet apart, and some of the trees may need to be removed for best orchard operation. The trees shown in figure 9 are obviously too close.

Probably 25 feet apart each way is the minimum distance advisable for sweet cherries; many growers prefer 28 to 32 feet each way (fig. 10).

The square system is generally used in planting cherry trees; however, a contour system should be considered on sites where there is danger of erosion. Contour planting means planting each row of trees at the same level or on a contoured line with a slight grade along which water can move slowly. Sometimes a system of terraces is desirable. In contour planting, there should be a minimum distance of about 18 feet between rows of sour-cherry trees, and about 22 feet between rows of sweet-cherry trees.

Soil and moisture conservation are important for the best production. Usually the extra time

required to plan and lay out a good conservation system is well spent.

The details of planting do not differ from those usually followed with apples, peaches, or other fruit trees commonly planted in sections where cherries are grown.

When a tree is being prepared for planting, all mutilated or injured parts of the roots should be removed; long, slender roots, if they occur, should be cut to match the length of the main roots.

Every precaution should be taken to prevent the roots from becoming dry. The tree roots will

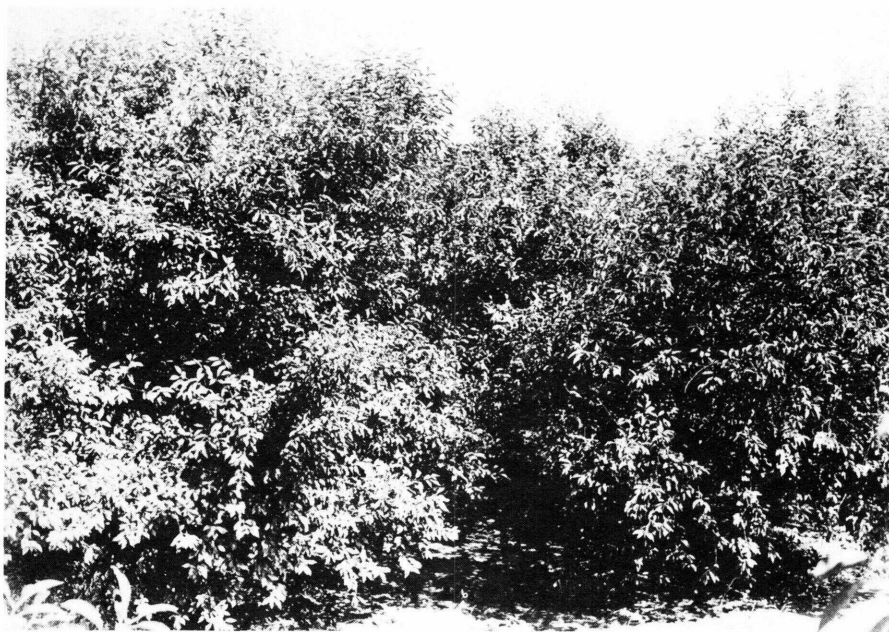
be injured if they are unduly exposed to cold or to drying out during the period between trimming and planting. Many poor stands of cherry trees have resulted from allowing the roots to be exposed just before planting.

In filling the hole after a tree has been put into position and alined, only pulverized topsoil should be used around the roots. Care should be taken to work the soil in closely; moving the tree up and down very slightly as the hole is being filled will help settle the soil among the roots. As the filling progresses, the soil should be firmly tamped about the roots; when the operation is completed,



P-16477

Figure 8.—Montmorency cherry orchard about 21 years old, New York. The trees are 14 feet apart each way and tall. As a result of the trees being planted too close together, the branches are long and slender.



BN-13429-X

Figure 9.—Twelve-year-old Montmorency trees. The permanent trees are planted 24 by 24 feet on a square system, and there is a semipermanent tree in the center of the square. These trees are on mazzard stocks and in good soil but are too close together.

the hole should be filled to the surface. If water is available, the hole should be filled with water

when it is about two-thirds filled with soil then completely filled with soil several hours later.

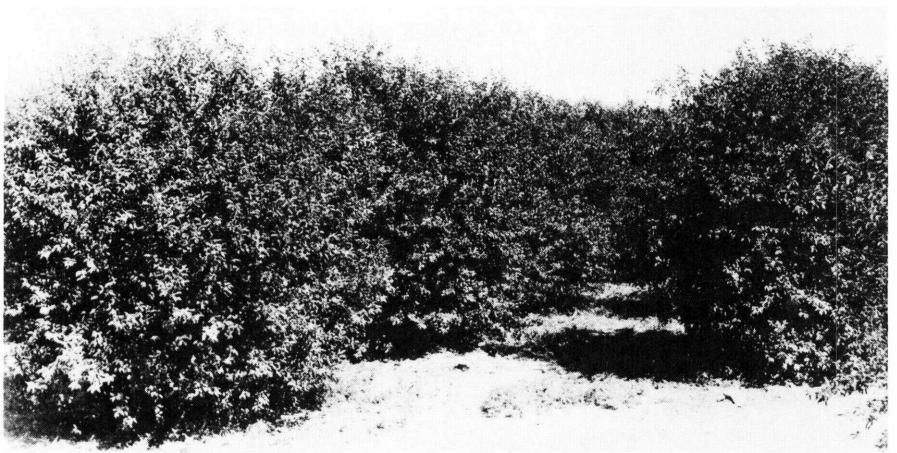
TILLAGE, AND MAINTENANCE OF SOIL FERTILITY

Commercial cherry orchards usually are given clean tillage with a disk harrow during the early summer, or until about the middle of July. There is a great difference in the clean-tillage practices of different growers. Some growers cultivate their orchards once a week during the active growing period of the trees; the modern trend, however, is toward three or four cul-

tivations during the entire season.

An early-summer cover crop should not be grown in the cherry orchard. The rapid growing of fruits and shoots requires large amounts of moisture and soil nutrients. Cover crops in the early summer, when most growth takes place, may compete seriously with the trees.

If there is danger of soil and



BN-13430

Figure 10.—Well-spaced trees in a Montmorency cherry orchard. The semipermanent trees were removed when 12 years old. (Compare with fig. 9, which shows the same orchard before the semipermanent trees were removed.)

water loss from erosion, it is necessary to have a more continuous cover crop. Usually a cover crop is seeded at the last cultivation, at about the time the fruit is harvested; it is disked down early the following spring. Some successful cherry growers allow weeds to grow as a cover crop during the late summer and fall. However, a planned cover-crop system is often necessary to prevent erosion on sloping locations, even where contour planting or terracing is not essential.

Other advantages of cover crops are increasing the porosity of heavy soils, increasing the available soil moisture, and retaining the soil nutrients in sandy soils. The type of cover crop used, and the method of handling it, vary in different districts and sometimes even on different farms in the same locality.

In many sections, one of the best cover crops for cherries is rye, sown in late summer at the rate of about 112 bushels per acre. It should be disked down well before it matures in the spring, to prevent competition with the trees. Some growers prefer to use a late-summer crop that does not survive the winter, such as oats, millet, or buckwheat.

Sometimes cherry orchards can be maintained satisfactorily in sod, if adequate nitrogen fertilizer is applied. Under a sod system, however, the trees may suffer from lack of moisture unless the soil is deep. A mulch of straw, hay, or some such material around the trees is valuable. If sod is available, it should be used with the mulch; sod is especially desirable on relatively shallow soil. Trees grow better under

early-summer cultivation, and a continuous sod should be considered only when necessary to prevent erosion. Where bluegrass is native, it is one of the best sods; in other districts the native grasses, lespedeza, and other legumes may be used.

Application of a complete fertilizer, such as 10-10-10, at the rate of about 250 pounds per acre when the crop is planted, is often valuable in obtaining a vigorous cover crop.

The fertilization procedure for cherries is similar to that necessary for other orchard trees; it varies somewhat with the soil. Cherries usually respond well to nitrogenous fertilizers such as sodium nitrate, ammonium sulfate, and ammonium nitrate. Because of differences in the soil, no definite amount to apply can be stated. As a general guide, $\frac{1}{2}$ pound of sodium nitrate for each year of the tree's age may be used. Thus, a 6-year-old tree would be given 3 pounds of sodium nitrate, or $1\frac{1}{2}$ pounds of ammonium nitrate, since the latter contains twice as much actual nitrogen as the sodium nitrate. Usually the application of any other element is not necessary, but cherry trees in a few sections have responded to potassium.

The fertilizer should be spread uniformly under and around the trees to just beyond the drop of the branches. Nitrogen fertilizer may be applied either in fall or early spring. Usually it is necessary to apply more fertilizer to trees grown in sod than to those that are clean cultivated. For example, trees in bluegrass sod require about three times the amount necessary for cultivated trees.

An orchard may endure an interplanted crop without appreciable ill effect, but the crop will be of no benefit to the trees unless the orchard is given better tillage because of it. Beans, peas, tomatoes, and other vegetables of like cultural requirements are the least objectionable. Crops that require late-summer cultivation should not be used in the Northern States, where winter injury of cherry is common because of immaturity of the wood.

The planting of an annual crop in an orchard is a system of double cropping in which the more important crop is the cherry. The tops require only a small part of space aboveground, but the roots occupy a large part of the soil much earlier in their lives than is commonly supposed.

PRUNING

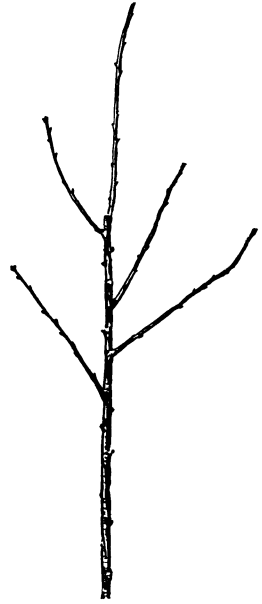
Trees of the sour-cherry varieties tend to spread in growth and those of the sweet varieties are more upright. These different

growth habits should be considered in pruning and training the trees. The modified-leader system is preferable for all types of

cherries; but the sweet varieties tend naturally toward a central-leader tree, and it is best not to try to change them much.

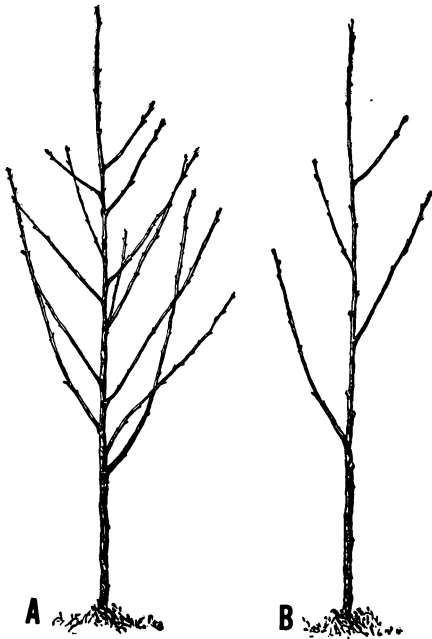
Sour-Cherry Trees

Both well-grown 1-year-old and 2-year-old sour-cherry trees should be branched when received from the nursery. About four branches should be selected for main, or scaffold limbs of the tree (figs. 11 and 12). The lowest scaffold limb should start 14 to 16 inches from the ground; the others should be well spaced around the trunk up and down so



G-123

Figure 12.—Montmorency tree grown 2 years in the nursery and about 4 feet high, pruned properly for setting in the field. Note that the original leader was cut back after 1 year in the nursery but that the lateral branch selected as a leader was not cut back.

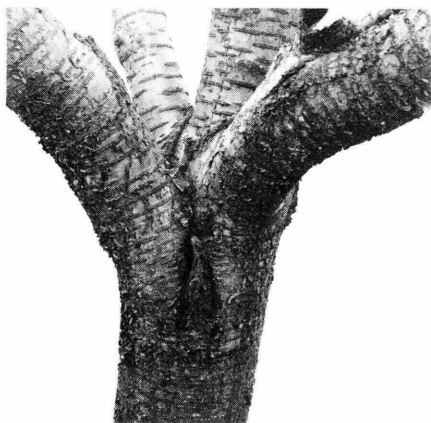


G-127, G-126

Figure 11.—One-year-old Montmorency cherry trees, about 3 feet high, showing method of pruning at time of planting: A, Before pruning; B, after pruning.

that none is directly over a lower one. Where possible, the scaffolds, or main branches should be at least 4 to 6 inches apart up and down the trunk. If all are allowed to develop from the same height, a weak tree is likely to result (figs. 13 and 14).

For these scaffold limbs, only branches with the widest angles should be retained. The more vigorous branches should be selected, and should be cut back to about the length of weaker ones, so that all may develop to approximately equal length. The



G-129

Figure 13.—Montmorency cherry tree that has no leader, and has all scaffold limbs arising at the same height. The limb at the left is very weak at the crotch and is likely to break and leave a large wound on the trunk.

main stem, or trunk, is not cut back at planting time; it should be left higher than any of the scaffold branches (figs. 11 and 12).

One year after planting, little pruning should be necessary. At this time, extra scaffold limbs that may have been left at planting can be removed. If some scaffold limbs are more vigorous than others, they may be suppressed by (1) removing some of the lateral branches on the scaffold limb and (2) pruning back the main one to an outward- and upward-branching lateral.

After a tree has been in the orchard 2 years, its leader should be cut back to a strong outward and upward lateral. Then, there should be another selection of

two or three scaffold limbs on the upper part of the trunk, so that about six finally remain well distributed along about 3 feet of the trunk.

The pruning during the first 4 or 5 years is mainly to train the young trees so as to obtain maximum strength and productivity. Some pruning will be necessary each year to maintain a balance between the scaffold limbs. If some are allowed to develop more rapidly than others, the leader and the weaker scaffold branches will be choked out (fig. 15). More pruning than necessary, however, will delay bearing and dwarf the tree.

When sour-cherry trees reach mature bearing age they require little pruning except some thinning out of weak branches, especially on the inside of the trees



BN-13487-X

Figure 14.—Eight-year-old cherry tree, showing type of scaffold-limb breakage common on cherry trees on which several limbs are allowed to develop at the same height.

(fig. 16). If this is not done they become bushy (fig. 17) and hard to spray and pick, and they bear many small, unevenly ripening fruits (fig. 18). It is best to head back trees that become too tall.

This can be done by heading back the branches. Moderately light pruning accompanied by adequate nitrogen fertilization will help maintain good terminal growth and vigorous spurs.



G-130-P

Figure 15.—Three-year-old Montmorency cherry tree with weak crotch that resulted from allowing the scaffold branches to crowd out the leader.



G-131

Figure 16.—Vigorous Montmorency cherry tree, about 7 years old. It received little pruning after selection of scaffold branches. When the tree was photographed, little was needed except a light thinning out of weak limbs in the center. Note the strong, well-spaced scaffold branches.

Sweet-Cherry Trees

A 1-year-old sweet-cherry tree has few or no lateral branches when received from the nursery. If a tree 4 to 5 feet high is used,

many growers prefer not to cut back the leader for at least 2 years. If there are branches, they may be selected and spaced around the trunk by much the



G-132

Figure 17.—Twelve-year-old Montmorency cherry tree that had received no pruning for 5 years and very little pruning before that. When photographed, it was too bushy for uniform ripening of high-quality cherries, for thorough spraying, or for easy harvesting of the fruit. All that is needed, however, was some thinning of weak limbs in the center. Note the strong, well-spaced scaffold branches.

same method described for sour-cherry trees. The branches should be cut back only if necessary to reduce the longest ones to about the same length as the shortest.

The scaffold branches of a 2-year-old sweet-cherry tree usually can be selected at the time it is planted. These branches should have wide angles at their bases and should be spaced 8 to 10 inches above one another. Well-selected branches will be stronger and more resistant to

winter injury than poorly formed ones. Only the largest and most vigorous ones should be cut back at all, and they should be cut very little. Many well-formed sweet-cherry trees have no pruning at all from the time they are set until they reach maturity. Some pruning, however, is usually needed to maintain a balance in growth of scaffold branches (fig. 19).

Between the ages of 2 and 7 years, when sweet-cherry trees usually come into bearing, prun-

ing should be very light. The tree is pruned only enough to help balance the scaffold limbs and direct the leader to an outside branch if the leader becomes extremely vigorous.

Dead or broken limbs are removed, and weak ones thinned out (fig. 19). When they become too high for convenience in spraying and picking, the most upright limbs may be cut back.

PICKING AND PACKING THE FRUIT

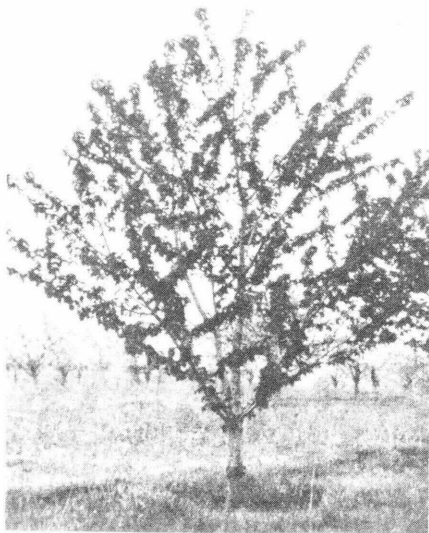
Picking

Cherries are picked with or without their stems, depending on the disposition to be made of them. When they are to be sold on the local fresh-fruit market or shipped to a distant market, the stems must be left on; if they are separated from the stems, juice will ooze from the fruit and cause rapid decay. Sweet varieties, and the sweet-sour hybrids (Dukes), usually are harvested with stems attached. After some experience, pickers can pick cherries with stems attached with little damage to the fruits or spurs on the trees.

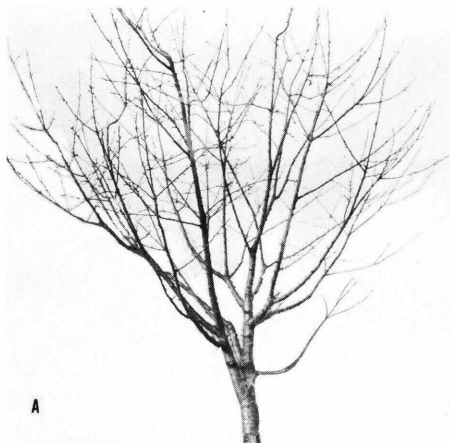
When cherries are harvested to be processed for canning or freezing, they are picked without stems. For many years they have been harvested by hand, into pails (fig. 20) that usually are tied to the picker's body so he can pick with both hands. The fruit is emptied from the pails into lugs, and hauled to the processing plant.

The annual harvesting of sour or red tart cherries by hand has been tedious and expensive. Also, the seasonal labor supply is often uncertain, and workers require close supervision.

Today, mechanical shakers are used in most commercial orchards. The tractor-mounted, hydraulically activated boom-shaker seems to be preferred; it is operated in combination with one of several types of fruit-collecting units. The tractor-mounted boom has a clamp or



P-16423
Figure 18. — Seven-year-old sweet-cherry tree that received little pruning after being planted. Too many of the lower branches originate at the same height; otherwise the tree is rather well shaped and requires little pruning.



BN-13428-X, BN-12431

Figure 19.—A six-year-old sweet-cherry tree that never has been pruned except for selection of scaffold branches. Note the well-spaced, wide-angled scaffold branches and the modified leader. B, Same tree after a light-thinning-out pruning.

claw at the end that can be moved about so the clamp can be closed on a scaffold limb. Then the operator hydraulically operates the boom; this causes the limb to shake, and the cherries fall into a canvas frame.

Collecting units catch the fruit dropped by the mechanical harvesters. These units usually are made of 6- to 12-ounce canvas and lightweight frames, mounted on wheels or skids. The cherries are emptied from the units into lugs, other containers, or conveyors, as the units are moved from tree to tree down the row.

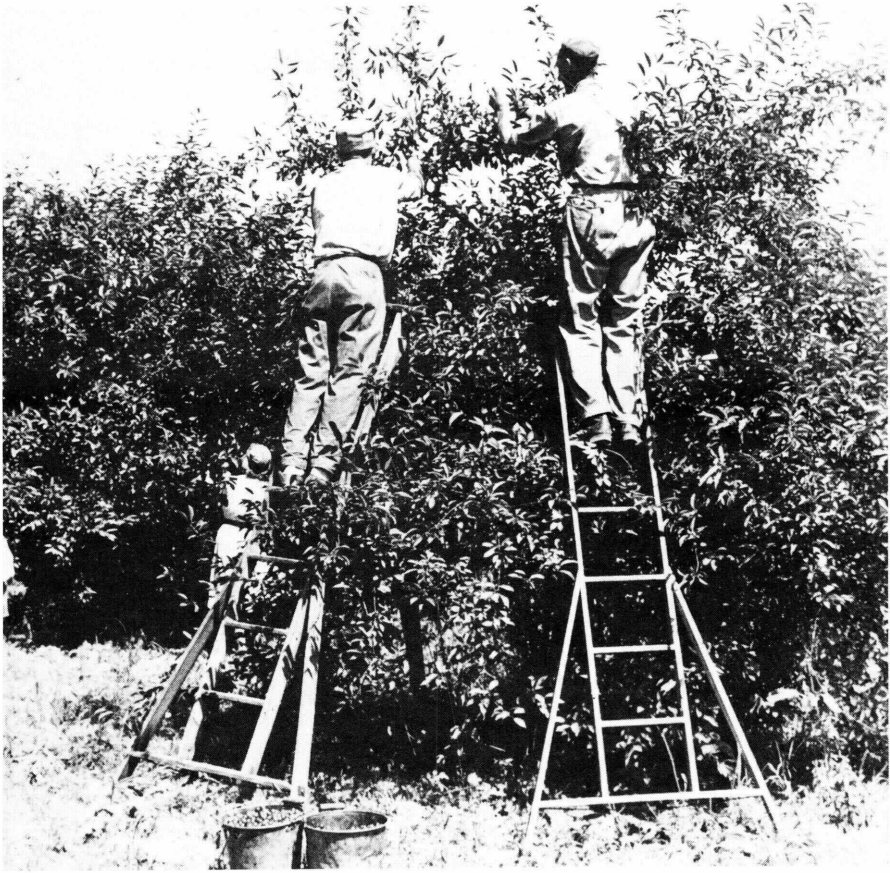
After being harvested, cherries are handled by one of several methods. From lugs or conveyors, they may be emptied into tanks of cold water, then transported to the processing plant by tractors or trucks. The use of conveyors, when practical, reduces the

bruising of cherries as they are moved from the collecting units to the tanks of cold water.

Transportation in tanks of cold water is an advantage whether or not mechanical harvesting is employed. Prompt immersion of the cherries in cold water helps them retain orchard quality, and reduces spoilage and scale. If hand picked, the cherries may be emptied directly from the pails onto a sorting table or conveyor, from which they are carried into the tank of cold water. When they arrive at the processing plant, they are flumed out into a receiving "boot" or tank by the use of additional water.

Packing

A number of methods are used to pack cherries for the fresh-fruit market. Both sweet- and



BN-13488-X

Figure 20.—Picking Montmorency cherries without stems for a processing plant. Generally, tin pails or wooden lugs are used as orchard containers.

sour-cherry types are often sold for fresh consumption, and are very popular in some markets.

In some orchards, fruit is packed directly in baskets of various sizes. Sometimes the picking pails are emptied onto a sorting table or conveyor from which the cherries are transferred to 1-quart boxes; these are packed

into 16- or 24-quart crates for marketing.

Also used are the western lug, holding 15 to 20 pounds, and the 4-quart climax basket.

For highest quality and least spoilage, cherries for fresh consumption must be handled with stems attached and must be kept cool.

DESCRIPTION OF VARIETIES

The number of important cherry varieties grown in Eastern United States are relatively few. Only those most commonly grown are described here.

Montmorency is by far the leading sour variety. Several strains of this variety have been selected and some appear promising, especially to lengthen the season. Montmorency is self-fruitful and does not need to have another variety interplanted with it.

After Montmorency, the next most important sour varieties are English Morello and Early Richmond; they also set good crops without cross-pollination with other varieties.

The Duke cherries are hybrids of sour and sweet cherries, and have some of the characteristics of each. The Dukes vary considerably in their pollination requirements. The early-flowering Dukes, such as Brassington and Reine Hortense, should be interplanted with sweet cherries and the late-flowering ones, such as Royal Duke, with sour varieties.

Sweet-cherry varieties are often separated into two groups—the heart, or soft-fleshed, type, such as Seneca or Governor Wood, and the bigarreau, or firm-fleshed type, such as Windsor or Napoleon. The leading sweet varieties in Eastern States are Windsor, Schmidt, Lambert, and Napoleon; Seneca and Black Tartarian are some-

times desirable because of their earliness.

Most sweet varieties are self-unfruitful. It is therefore necessary to plant different varieties near enough to each other to insure transfer of pollen from one variety to another. Also, three common varieties, Bing, Lambert, and Napoleon, will not pollinate each other; some other variety, such as Windsor or Van, must be planted with them.

Sour Varieties

The principal sour-cherry varieties are described in order of their ripening as follows:

Early Richmond.—Early, ripening 7 to 10 days before Montmorency. Fruits red, small to medium sized, of only fair quality at best. Value doubtful; suggested only because of early ripening; trend is away from it toward early strains of Montmorency.

Montmorency. — Midseason. Fruits bright red, large, of high quality. Trees vigorous and high yielding on good soil. By far the leading sour-cherry variety; the only one grown by many of the most successful growers.

English Morello.—Late, ripening 10 days to 2 weeks after Montmorency. Fruits almost black when fully ripe, medium sized; juice high in sugar, but so high in acid that a sour flavor results. Trees spreading, small (therefore sometimes used in home-garden plantings). Most

commonly grown of Morello type, but this type not recommended for general planting because of low yield, limited demand for the fruit, and susceptibility to leaf spot.

Duke Varieties

Duke cherries (fig. 21) should be grown only on a small scale unless there is a known demand for fruit of this type. They are neither sweet nor sour, but a blend of both. Most people find them too sour for eating fresh, but many prefer them for canning, freezing, and pie making. The following

varieties, listed in the order of their ripening dates, are suggested:

Brassington.—Ripening during sweet-cherry season or soon after. Fruits red, medium sized; quality more like that of sweet cherries than that of sour cherries. Trees often lacking in vigor, breaking easily, and low yielding. Preferred by many for pie making.

Reine Hortense.—Midseason. Fruits light red, large, sweeter than those of Brassington, soft fleshed, juicy, of poor keeping quality. Trees more vigorous and



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Figure 21.—Duke cherry trees, 8 years old. Because of the very upright habit of growth and the heavy foliage, individual branches are not visible.

productive than those of Brasington, but also breaking easily. Duke variety should be used most often.

Royal Duke.—Latest of Duke varieties listed. Fruits dark red, medium sized to large, slightly sweeter than the sour types, attractive. Trees often vigorous, high yielding, resembling the sour varieties, breaking fairly easily. Preferred by some for pie making and eating fresh.

Sweet Varieties

Sweet-cherry varieties are not as dependable as sour ones in most sections. They are more subject to difficulty in establishing the trees; are subject to frost damage, cracking of fruit, brown rot, and loss of fruit from birds damage.

The preferable sweet varieties in the Eastern States are Windsor, Lambert, Schmidt, and Napoleon. Seneca is sometimes planted for a very early variety; Black Tartarian and Victor are planted to ripen slightly later but before the main season. Yellow Spanish is one of the varieties most hardy under low winter temperatures. Schmidt suffers less from sudden changes in temperature during the winter.

Trees of Schmidt, Black Tartarian, and Napoleon are upright growing and those of Seneca and Windsor are more spreading. Fruits of Windsor are relatively resistant to brown rot; those of Black Tartarian and Seneca are very susceptible to this disease.

The varieties are listed here in the approximate order of their ripening.

Seneca.—Very early. Fruits red, medium sized, of good quality, soft fleshed, juicy. Often used where very early variety is desired but frequently fruits are largely destroyed by birds.

Black Tartarian. — Early. Fruits purplish black, small to medium sized, of good quality, soft fleshed, juicy. Used principally to lengthen season in home plantings and for local sales.

Victor.—Early. Fruits light colored with pink blush, medium sized to large, firm fleshed. Trees strong and productive.

Van.—Midseason. Fruits dark red, firm fleshed, of high quality. Trees strong and productive; a new variety worth testing, especially for hardiness and resistance to cracking.

Bing.—Midseason. Fruits very dark red to black, large, of high quality, firm fleshed; very attractive when fully ripe, but often cracking open and rotting before fully ripe. Less satisfactory in the East than in the West because of susceptibility to winter injury, cracking, brown rot, and infection of the fruit. Trees usually are only fairly vigorous and productive in the East.

Napoleon (Royal Ann).—Midseason. Fruits light yellow, have pink blush, large, of high quality, firm fleshed, subject to less extensive cracking and rotting than Bing during moist seasons. Trees vigorous, productive, and fairly

tolerant of low winter temperatures. Most commonly grown light-colored sweet cherry.

Yellow Spanish.—Midseason. Fruits yellow, have pink blush and attractive ground color, smaller than those of Napoleon, of good quality, firm fleshed. One of the most winterhardy sweet cherries.

Lambert. — Midseason-late. Fruits dark red, large, firm fleshed, attractive although subject to cracking. Trees vigorous, strong, productive, and fairly hardy. An important Western variety.

Windsor.—Medium late. Fruits dark changing to black when ripe, medium sized to large, of

high quality, firm fleshed; smaller and less attractive, but less subject to cracking and rotting than fruits of Bing, Lambert, or Schmidt, therefore often more profitable. Trees spreading, vigorous productive, and fairly hardy. One of the best varieties for general planting.

Schmidt.—Medium late. Fruits dark red to almost black when ripe, large, of high quality, firm fleshed, very attractive although sometimes injured by cracking but less so than Bing or Lambert. Trees very vigorous, apparently relatively hardy when low temperatures follow warm periods in winter, but relatively late in coming to full bearing.

DISEASES

Virus Diseases

Several virus diseases affect cherries in north-central and north-eastern parts of the United States.

Ring spot

The virus disease that most commonly attacks cherry trees is known as ring spot. On sour-cherry trees, symptoms are visible only for 1 to 2 years after the initial infection by this disease. After this, infected trees are virus carriers that show no symptoms of the disease other than varying degrees of retarded growth. During the first stages of infection, the trees become retarded in foliation and thin in appearance. Many leaves have in-

distinct rings of dead tissue, and some leaves become "shotholed" and tattered.

On sweet-cherry trees, ring spot causes discolored and dead ring and shotholed patterns on the leaves, which may become tattered. Symptoms are more severe during the initial stages of the disease; usually they recur annually, and are more pronounced on leaves formed early in the season.

Yellows

The disease known as yellows is causing increasing damage to sour-cherries; about one-third of all trees in old orchards are affected. The first symptom is a green and yellow mottling of

older leaves. This is followed by periodic waves of partial defoliation, starting 3 to 4 weeks after petal fall.

When trees have been affected by yellows for several years they develop abnormally large leaves and few spurs; they bear small crops of large-sized fruit. Eventually, affected trees become thin, fail to make normal growth, and become marginal producers. Symptoms are most pronounced in the better producing areas that have cool climates, such as those bordering the Great Lakes; symptoms may not even be apparent in warmer areas of the midwest.

Certified yellows-free nursery stock is available from many nurseries; the grower should make sure he obtains such stock to start his orchard. Also, he should not start a new orchard adjacent to an old one.

X-disease

X-disease affects both sweet- and sour-cherry trees. Affected trees have sparse foliage, are light green, and fail to mature their fruits. At normal maturity time, fruits remain small; sour cherries remain pink, and sweet cherries become light red instead of dark.

X-disease virus spreads from diseased chokecherries to other fruit trees. It can be controlled by removing the diseased orchard trees and, at the same time, by removing chokecherries from the vicinity of the orchard.

Several other virus diseases oc-

asionally affect cherries in Eastern States, but as yet are not considered serious.

Fungus Diseases

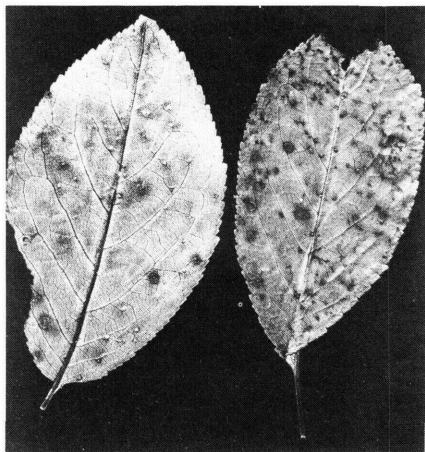
The most important fungus diseases of cherry are leaf spot ² (fig. 22) of the foliage and brown rot ³ of the fruit.

Leaf spot

Leaf spot is caused by a fungus that overwinters on fallen leaves. In spring, spores are discharged from these leaves and carried by the wind to the new leaves on which they germinate and cause infection. Small spots, purplish at first but finally brown, develop on the leaves and produce enormous numbers of summer spores;

² Caused by *Coccomyces hiemalis* Higgins.

³ Caused by *Monilinia fructicola* Honey and *M. laxa* Honey.



BN-11298-X

Figure 22.—Sour-cherry leaves affected with leaf spot.

these spread infection to adjacent leaves and trees.

If not controlled, leaf spot will cause partial to complete defoliation. In mild cases, only a small number of leaves may be spotted, but frequently during periods of damp or rainy weather the spots become so numerous that the tree is completely defoliated before the crop is harvested.

Control of leaf spot on sour cherries (fig. 22) requires at least five spray applications: (1) As soon as the petals have fallen, (2) when about three-fourths of the shucks have dropped, (3) about 10 days after the second spray, (4) 10 days to 2 weeks after the third spray, (5) immediately after harvest.

Fungicides.—Growers should consult their State agricultural colleges or county agricultural agents for information regarding the fungicides best suited to their localities.

Various sulfur or copper compounds have been used for many years to control cherry leaf spot. The sulfurs include liquid lime-sulfur, wettable sulfur, and flotation paste sulfur; the coppers include bordeaux, copper oxychloride, and tribasic copper sulfate.

These chemicals usually give satisfactory results, but occasionally they cause damage. Liquid lime-sulfur may discolor the fruit, and bordeaux may reduce the size of the cherries. Where such damage is likely to result, the less caustic forms of sulfur, and milder fixed copper (copper oxychloride or tribasic copper

sulfate) may be used to hold the disease in check.

To spray sour cherries except the English Morello and Wragg varieties, lime-sulfur may be used, mixed at the rate of 1 to 2 gallons in each 100 gallons of water. Or bordeaux mixture may be used, mixed at the rate of 2 to 4 pounds of copper sulfate plus 4 to 8 pounds of hydrated lime in each 100 gallons of water. A third selection is the fixed copper, mixed at the rate of 3 pounds of material having 25-percent metallic copper content plus 3 pounds of hydrated lime in each 100 gallons of water.

Sweet cherries and the English Morello and Wragg varieties of sour cherries are sensitive to copper, and never should be treated with a copper compound. Lime-sulfur may be used, mixed at the rate of 1 gallon in every 100 gallons of water; it may be used in all five applications, but less injury will result if lime-sulfur is used in the first application and wettable or flotation sulfur (6 pounds in each 100 gallons of water) is used in the other four applications.

In recent years, the organic fungicides (captan, dodine, ferbam, and glyodin) have given outstandingly better results than the older type sprays of sulfur or copper. Therefore, much acreage is now sprayed with these materials. Formulations vary in different parts of the country. The quantities usually recommended for mixing in 100 gallons of water are: 1½ pints to 2 pints of

glyodin; or, 2½ ounces of dodine; or, 2 pounds of captan; or 18¼ to 24 ounces of ferbam.

Brown rot

A widespread and destructive fruit rot of peaches and plums is called brown rot; it frequently causes heavy losses to cherry growers during seasons when the skin of the fruit has been cracked by excessive rain or hail.

The first four spray applications made for control of leaf spot usually control the brown rot fungus. If the orchard has had previous outbreaks of brown

rot, an additional spray application should be made just as the fruit begins to color. In this pre-harvest application, many growers prefer to use captan or wettable sulfur instead of either lime-sulfur or bordeaux mixture.

Other fungus diseases, such as black-knot,⁴ powdery mildew,⁵ leaf rust,⁶ and scab,⁷ occur to some extent on cherry. These diseases are usually less serious than either leaf spot or brown rot. Most of them are held in check by the applications of spray used to control leaf spot and brown rot.

INSECTS

The insect pests most commonly found on cherry trees are the black cherry aphid,⁸ the plum curculio,⁹ two kinds of fruit flies,¹⁰ and the pear slug.¹¹

Black Cherry Aphid

The black cherry aphid is a tiny, black, shiny insect that curls the tender young foliage of the sweet cherry early in the season (fig. 23). Often, it severely checks growth. It rarely injures the sour cherry seriously.

The insects pass the winter as tiny, black eggs on twigs and

small branches. These eggs hatch in spring about the time tree growth starts, and the young aphids cluster on opening buds.

Spray when aphids appear during spring and summer. Use malathion, endosulfan, parathion, or diazinon, diluted according to directions on the container label. (See "Precautions," p. 30.)

Plum Curculio

The plum curculio is a small beetle that hibernates in trash in the orchard or near it. Early in spring, soon after the cherry trees bloom, the curculios move to the trees. Females insert their

⁴ Caused by *Dibotryon morbosum*.

⁵ Caused by *Podosphaera oxyacanthae*.

⁶ Caused by *Tranzschelia prunispinosae*.

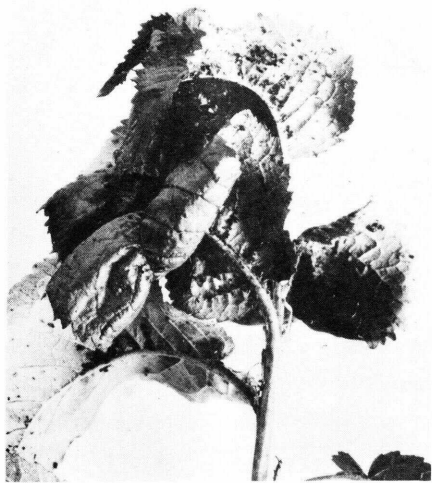
⁷ Caused by *Cladosporium carpophilum*.

⁸ *Myzus cerasi*.

⁹ *Conotrachelus nenuphar*.

¹⁰ *Rhagoletis cingulata* and *R. Fausta*.

¹¹ *Caliroa cerasi*.



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Figure 23.—Cherry leaves curled by the cherry aphid.

eggs just beneath the skin of the cherries; then they make crescent-shaped slits, each of which partly surrounds an egg puncture. The curculio larvae, or grubs, feed within the cherries for several weeks.

The plum curculio can be controlled also with two or three applications of parathion, EPN, azinphosmethyl, or methoxychlor, diluted and used in accordance with recommendations on the container label. (See "Precautions," p. 30.) Applications should be made at 8- to 10-day intervals, beginning at petal fall or shuck split. Do not apply azinphosmethyl more than 8 times per season.

Fruit Flies

In the Northern States, cherries are sometimes infested by

Do not use azinphosmethyl or parathion in lone plantings; they should be applied only by a trained operator.

maggots of two species of fruit flies.

Control.—The adult flies can be killed before they lay their eggs by spraying with rotenone, perthane, parathion, methoxychlor, or diazinon. Malathion ultra low volume spray may also be used, but only in the Northwest, and must be applied by air. Recommendations for diluting these materials and cautions in handling them are given on container labels and should be followed closely. The first application should be made early in June, and the spraying should be repeated 2 to 4 times at 7- to 10-day intervals.

Pear Slug

The pear slug, also called the cherry slug, is a slimy, dark-colored worm that feeds on cherry leaves. The slugs appear on the trees in May or June, according to the locality; a second brood

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may appear in midsummer or late summer.

Control.—This pest is readily

controlled by spraying the trees with parathion, as indicated for the plum curculio.

PRECAUTIONS

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key—out of the reach of children and animals—and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the

label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

Note: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Environmental Protection Agency, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.

